DOCUMENT RESUME

ED 219 445 TM 820 469

AUTHOR Sanford, Julie P.; Evertson, Carolyn M.
TITLE Time Use and Activities in Junior High Classes.
INSTITUTION Texas Univ., Austin. Research and Development Center for Teacher Education.
SPONS AGENCY National Inst. of Education (ED), Washington, DC.
REPORT NO RDCTE-RDR-6114
PUB DATE Apr 82
CONTRACT OB-NIE-G-80-0116
NOTE 34p.

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Academic Achievement; *Class Activities; Classroom Research; English Instruction; *Junior High Schools; Mathematics Instruction; Student Behavior; Student Evaluation of Teacher Performance; *Time; *Time on Task

ABSTRACT

Time use in different activities in junior high school is described, and relationships between class time use and student achievement, behavior and attitude are examined. A total of 102 English and mathematics classes were observed for about 9 hours each. Data included descriptive narratives, time logs, student engagement ratings and observer ratings of student and teacher behavior. Results showed that there is much variation in the way individual junior high school teachers use class time, within a limited number of activity structures. Significant relationships were found between time use and class achievement and attitude in mathematics classes, but not in English classes. (Author/BW)

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Time Use and Activities in Junior High Classes

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Research and Development Center for Teacher Education
The University of Texas at Austin

April, 1982

This study was supported in part by the National Institute of Education, Contract OB-NIE-G-80-0116, P2, Classroom Organization and Effective Teaching Project. The opinions expressed herein do not necessarily reflect the position or policy of the NIE and no official endorsement by that office should be inferred. Requests for reprints should be addressed to: Communication Services, R&DCTE, Education Annex 3.203, The University of Texas at Austin, Austin, Texas 78712.

TM 820 469

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Abstract

This paper describes time use in different activities in junior high school and examines relationships between class time use and student achievement, behavior and attitude. A total of 102 English and mathematics classes were observed about 9 hours each. Data included descriptive narratives, time logs, student engagement ratings and observer ratings of student and teacher behavior. Results showed that there is much variation in the way individual junior high school teachers use class time, within a limited number of activity structures. Significant relationships were found between time use and class achievement and attitude in mathematics classes, but not in English classes.

Time Use and Activities in Junior High Classes

Studies of class time use have utilized a number of very different measures, including individual student time on task, days or hours of instruction, student task engagement rates, and classroom organization or allocation of time. Among the measures of time studied, individual students' time on task or engaged time has often proven to be the strongest predictor of achievement gains, but some measures of time allocated to instruction have also been shown to be significantly and positively related to achievement (Borg, 1980; Frederick & Walberg, 1980). In the Beginning Teacher Evaluation Study (BTES), for example, allocated time, based primarily on teachers' logs of instructional time, was significantly related to achievement in five content areas in reading and mathematics, accounting for from two to 24% of residual variance on the posttest (Borg, 1980). These and other findings suggest that allocated time can be a powerful tool for teachers and administrators in increasing student achievement. One reason it has potential is that allocation of time to different activities, unlike student engaged time, can be controlled directly by the teacher. Class time spent in different activities is a variable that teachers themselves can assess and manipulate in planning for instruction.

This study looks at one aspect of class time use -- class time observed in different categories of activites -- and relationships between class time use and student achievement, attitude, and behavior in junior high classes. Two major questions are addressed.

1. How was class time used in the 102 classes in our sample? To what extent did patterns of time use vary across classes, teachers, and subject areas?

2. What is the relationship between how class time is spent and class mean achievement gains, student ratings of the teacher, and student behavior, as defined by on-task rates, off-task, unsanctioned rates and observer ratings of disruptive behavior in the class?

The activity categories used in the present study provide some qualitative distinctions among class activities, a distinction lacking in other studies of allocated time. For example, academic activities are categorized as content development (whole class instruction utilizing teacher-led discussion, presentation or recitation), seatwork (individual student tasks), or small group instruction. Previous research leads us to expect different effects for these activities. In the Beginning Teacher Evaluation Study, McDonald (Note 1) reported that in fifth grade classrooms student engagement during whole class presentation/recitation was more closely linked to achievement in reading and mathematics than was engagement during seatwork. Evertson, Emmer, and Brophy (1980) reported that in the Texas Junior High School Study (TJHSS) a subsample of more-effective mathematics teachers used about half of each class period for lecture and discussion and less than half for seatwork. Less-effective teachers used about one-fourth of the period for lecture and discussion and more than one-half for seatwork. At the secondary level in remedial reading, Stallings (Note 2) found that time-on-task effects were greatest when only engagement in interactive instruction (as opposed to seatwork) was considered. However Rosenshine (Note 3) cited conflicting results for seatwork versus verbal interaction and called for more research on student time use in different contexts.

The purpose of the present analysis, then, is to provide more descriptive information about how class time is used in junior high schools, to assess the extent to which data from the Junior High Organization Study (JHCOS) support previous research findings about the productivity of content development time (as opposed to seatwork), and to further explore relationships between activity patterns and achievment, student ratings of the teacher, and student behavior.

This study examines time use in two diverse subject areas, mathematics and English. Subject area forms an important context for investigating time use and activities. Different subjects with different learning goals and task demands would, logically, seem to require different amounts of time spent in different types of activities. Teaching social studies may require more time spent in class discussion than teaching mathematics. On the other hand, the content and organizational structure of mathematics assignments may be more conducive to sustained engagement in seatwork than the content of typical social studies or English literature assignments may be. Thus, relationships between student time use, activities, and student outcome measures may vary across different subject areas and grade levels. Most of the research on class time use and task engagement has been in basic skill areas in elementary schools. Subject matter differences may have more impact in secondary school levels than in elementary. Good (Note 4) has pointed out that there is relatively little information describing secondary school processes.

Methods

Data Sources

The sample used in this analysis consisted of 102 classes, 52 math and 50 English, taught by 51 teachers (two classes per teacher). Teachers were participants in the Junior High School Classroom Organization Study, a year-long study of classroom management in 11 junior high schools in a large southwestern city (Evertson, Emmer, & Clements, Note 6). Data from classroom observations made between the third week of classes and the end of the year were used for the present study, resulting in eight or nine 1-hour observations of each class in the sample. Observation data included descriptive narratives of instructional and behavioral events, logs of class time use, student engagement rates, and observer ratings of specific teacher and student behaviors.

For the present study, three measures of student behavior were utilized: Off task, unsanctioned, On task, and disruptive behavior. Off-task, unsanctioned, and On-task were student engagement rates derived from counts of students made every 15 minutes during observations. Students were coded as Off-task, unsanctioned when they were not engaging in assigned or expected tasks or were engaging in behavior contrary to class rules or procedures. Off-task, unsanctioned behavior could be disruptive or not at all disruptive. Students were coded as On-task when they were engaged or involved in assignments or expected tasks, either academic or procedural. A class on-task average provides a measure of student cooperation and involvement with class activities. It is not equivalent to measures of academic time on task or academic learning time. A third measure, disruptive behavior, was rated on a 1-5 point scale by the observer immediately after observation of the class.

A disruptive event was one which interferred with the attention or work involvement of three or more students or the teacher.

Entering achievement levels of classes were assessed by school district administered California Achievement Tests (CAT) in mathematics and reading. Pupil achievement was assessed in May using instruments designed to reflect instructional content in the school district. Student ratings of the teacher made in May were used as a measure of student attitudes toward the teacher and class.

Categorizing Class Activities

Using class narratives and time logs, minutes of time spent in observed class meetings were recorded for nine categories of activities. Subsequently some categories were aggregated to produce three additional activity categories and a proportion. The categories were defined as follows:

1. Administrative and procedural routines. This category was used whenever most of the students were involved in administrative or procedural activies such as roll call, anouncements, opening or closing (nonacademic) routines, discussion of grades, distribution of graded papers, discussion of schedules for assignments. If directions for seatwork or homework took more than 3 minutes and did not include content development, the time was noted in this category.

2. Transitions. Transitions were intervals between activities, when the majority of the class were involved in getting their supplies, passing in their papers or otherwise getting ready for another activity.

3. Grading. When most of the students were involved in grading an assignment in class, this category was used. Grading or checking was

considered a procedural activity, not academic. It was used when the apparent main purpose of the activity was to check answers and compute a grade on an assignment, not to review or clarify content. Students checked their own papers or exchanged them.

4. Content development. This category was used for whole class teacher presentation of content, lecture, demonstration, or explanation, whole class discussion, recitation, or review or any combination of the preceding activities. Review of a homework or seatwork assignment or a graded test accompanied by teacher explanation or student recitation was included in Content development. When directions for completing an assignment included explanation of the content they were included in this category.

5. Seatwork. This category was used when most of the students were working on individual tasks, either the same task or different tasks, at their own pace. Short teacher interruptions of seatwork to explain or clarify directions were left in seatwork time unless they lasted more than 1 minute. Directions for seatwork were included in seatwork unless they lasted more than 3 minutes. (If they lasted more than 3 minutes and reviewed the content they were counted as Content development; if they lasted longer than 3 minutes but did not include content, they were categorized as Procedural routine.)

6. Tests. Any activity described by the teacher as a test or diagnostic assessment was categorized here. Students worked alone, for a grade or a score, with minimal teacher assistance.

7. Dead time. This category was used when the majority of the students in the class had no assignment; they were simply waiting for the end of the period or for the beginning of a new activity. The

teacher had not provided or suggested any academic activities for students, and no activities were dictated by classroom routine.

8. Small group instruction. This category was used whenever the teacher was working with a small group of students for an extended period of time (more than 1 minute). Although the majority of students in the class may have been engaged in seatwork or procedural activities, the small group category took priority over all others.

9. Other. Any time use not included in the preceding categories was categorized Other.

10. All nonacademic activities. This was a composite category including Administrative routines and procedures, Transitions, Grading, and Dead time.

11. Total minutes. This was simply the total minutes of class time, from the beginning of class, usually marked by the ringing of the tardy bell, to the dismissal of the class by the teacher.

12. Total academic time. This was a composite category which included Whole class instruction, Seatwork, Tests, and Small group work. It included all of the class time that had an academic focus.

13. Ratio of content development time to content development plus seatwork time. This ratio provided an index of the proportion of academic time (excluding time spent in testing and small groups) spent in content development.

Results and Discussion

Stability of Time Use

Mean raw minutes of class time in each category and descriptive statistics for the 13 categories of time use were computed separately for 52 mathematics classes (26 teachers) and 50 English classes (25

teachers). Intraclass correlations between the classes taught by the same teachers indicated high levels of stability between class sections. These stability figures are shown on Table 1. Time-use categories showing the most variance between sections for a teacher were total class time, administrative and procedural time, and, for mathematics classes, grading and other. Total class time and administrative and procedural routine time were affected by school schedules and routines (such as announcements), and when one of a teacher's two class sections was longer than the other, the difference in time was usually taken up by administrative matters. For the most part, teachers' real class time use was consistent across class sections; therefore, the teacher was used as the unit of analysis for descriptive analysis of time use and for analysis of relationships between class time use and student behavior and outcomes. (The category Other was not used in any analyses.) Pearson correlations were computed between time use categories and teacher means on student off-task, unsanctioned behavior, student on-task behavior, observer ratings of disruptive behavior, student ratings of the teacher, and achievement residuals.

Activities in Mathematics Classes

Mean minutes of class time in different activities in mathematics classes are shown in Table 2. These data are based on eight observations each of 52 classes taught by 26 teachers, data aggregated by teachers. Table 2 provides some rough answers to the question, "How is class time used in junior high mathematics classes?" (At least in our sample from 11 schools in a single large school district.) First, the standard deviations and range of teacher means showed for different categories of time use on Table 2 indicate that classes varied greatly

in amount of time allocated to content development or seatwork, in the amount of time spent in a variety of nonacademic activities, and in total nonacademic or academic time. Classes were fairly uniform in length, about 55 minutes long. On the average, more time was spent in seatwork than in any other category (mean of 19.81 minutes per class), followed by whole class instruction (mean of 15.33 minutes). An average of 14.42 minutes was taken up by nonacademic or noninstructional activities -- administrative chores, transitions, dead time, and grading.

Within several activity categories however, great variation was seen across teachers. Table 3 shows contrasting time-use profiles for four teachers. Teacher A averaged only 6.34 minutes of content development per class, based on 16 observations divided between two different class sections. Students in Teacher A's classes (and students in classes of five other teachers in the sample) spent half or more of the available class time in seatwork, and less than 10 minutes in content development. In contrast, Teacher B used more time in content development (average 33.25 minutes) than in seatwork. This pattern was also characteristic of six other teachers who averaged at least 20 minutes a day in content development. Teacher C was the only mathematics teacher in our sample to use small group instruction regularly. Four others used it rarely. Teacher D's classes spent large amounts of time in nonacademic activities, an average of 21.85 minutes per class. Narratives of these classes showed frequent procedural or behavioral discussions, long transitions between activities, and higher than average dead time.

A common activity sequence in mathematics classes consisted of warm-ups, followed by checking, whole class instruction in the form of content development or review, and seatwork assignment. ("Warm-ups" were short review assignments which students routinely completed during the first 5 minutes of class, usually while the teacher checked roll and handled other administrative duties.) This basic sequence was by no means the only pattern of activities however. A few teachers frequently used more than one cycle of whole class instruction and seatwork per class meeting. In these classes the schedule might look like this: warm-up or grading homework, teacher presentation (content development), seatwork practice, checking and discussion, seatwork (begin homework).

Activities in English Classes

Based on the descriptive statistics for time-use categories shown in Table 4, allocation of class time in 50 English classes taught by 25 teachers appeared to be similar to patterns in mathematics classes. Examination of sequences and specific activities showed important differences, however. As in mathematics classes, more class time was spent in student seatwork (mean minutes per class 19.67) than in any other category. Content development averaged 15.57 minutes, with a wide range of teacher means. One teacher averaged only 4.75 minutes of content development per class meeting across 16 observations of two classes. Another averaged about 29 minutes per class meeting. Ten teachers used small group instruction to some extent, but few used it much, and grouping was almost entirely limited to spelling content. Average time spent in nonacademic activities was 13.48 minutes, and total academic time averaged 39.39 minutes, very similar to that in mathematics classes.

Within these categories of activities, however, English classes showed more variation than did mathematics classes. It was not possible, for example, to identify a "typical" sequence of activities, because activity sequences varied according to different topics within the curriculum: spelling, composition, grammar, reading, poetry, and mythology. Despite district-wide curriculum requirements, teachers varied in their allotment of class time to different topics and in their choice of instructional activities to teach different topics. One pattern of time use that distinguished some teachers, however, was the number of different activities usually undertaken in a single class period. Classes of 11 teachers were usually characterized by relatively long unbroken periods of class time devoted to only one or two main activities each class. Classes of 10 others usually contained at least three activity segments other than administrative routine. For example, these classes might consist of the following sequences: (a) administrative routine, (b) content development (grammar review), (c) grammar seatwork, (d) checking, (e) discussion of related grammar topic; or (a) seatwork (composition journal), (b) spelling quiz, (c) content development of a new grammar topic, (d) seatwork. Classes of four other teachers did not fall into consistent patterns of activity with regard to number of activities or segments.

Analysis of classroom narratives showed that often English classes having similar time use profiles differed greatly in the nature of activities students were engaged in. For example, Table 5 shows time-use averages for selected English teachers. Classes of Teachers E and F showed patterns of more-than-average time spent in content development and less-than-average amount of time in seatwork. Except

for the fact that Teacher F spent more class time grading papers with students, profiles for the two teachers suggested similar use of class time; but examination of class narratives showed that the two teachers were very different. Classroom narratives revealed that Teacher E led her classes through several different activities or topics of instruction in a class session. Students received a participation grade each day. For Teacher E and for several other English teachers whose classes spent a lot of time in content development with high levels of student involvement, observers frequently noted skillful pacing, variety, orderly student involvement in discussion, and alternation of content development and seatwork.

Whole class instruction in Teacher F's class, in contrast, often consisted of long, unbroken periods of students taking turns reading aloud, with very little attention from the teacher or interruptions for discussion. At other times, the entire class period was taken up by poetry or literature discussions in which the teacher answered many of her own questions, or by long periods of recitation over grammar topics.

Both Teacher G and Teacher H in Table 5 used a lot of class time in student seatwork, but their classes were otherwise very different. Teacher G used little content development (an average of only 4.75 minutes), but used some small group instruction. During seatwork she structured students' work into relatively short segments with high levels of accountabilty for completing the work, under close supervision and guidance by the teacher. In contrast, seatwork in Teacher H's classes averaged 24.45 minutes per period and usually began after a short segment of content development at the beginning of the period, and

lasted until the bell rang, to be handed in that day or another. Free time activities (games, magazines, old school albums) in this class were so varied and interesting that some students hurried through their work or even abandoned it to join other participants in these diversions.

Even for a single type of instructional activity in English classes, such variation was found from class to class that few assumptions could be made about the extent or nature of instruction taking place. For example, compare the following two descriptions of a common whole class instructional activity, reading of a story or play in class. First, in Teacher 37's class a brief introduction to the story, "Riki Tiki Tavy" has been presented by the teacher:

> The teacher continues, "So much of what makes Kipling's writing is just the way it sounds. So I'd like to read a story out loud, and you'll see a different beauty in the reading than from the TV. Lisa, would you read first?" Lisa reads rather quickly, quietly and slurred together. In a way, this gets the class off on a wrong foot; because they can't hear Lisa... Students go on reading out loud. Some read with great expression; some read very monotonically. At 1:53, one student is at the teacher's desk, discussing a lost assignment ... The teacher is busily working at her desk. She does not even know where students are in the story. When students can't pronounce a word or mispronounce a word they just have to skim over it. They get no help from the teacher. In this class they get no help from their classmates either. The teacher goes over to give a paper to one student and to talk to the student about it while the students are reading... No one is laughing at the funny or silly parts of the story. Students have bored or unhappy looks on their faces... A third girl joins in on the note passing. More and more students are getting restless; no talking, just wiggling bodies and staring and facial expressions and note passing. Students are still taking their turn at reading. The teacher is at her desk, and she is still grading papers. One boy is asleep on the back row on the right side of the room. The teacher does not see; she hardly ever surveys that corner of the room. ...The teacher interrupts and says, "O.K., let me read now. Maybe I can finish because we only have a few minutes before the bell rings." Several students start putting on coats and prepare to leave. The teacher is reading so quickly it is hard to follow. There is no expression in

her voice. At 2:30 the bell rings. The teacher says, "Sorry, we'll finish tomorrow."

Compare that "lesson" with the instruction taking place in Teacher 03's class, as they read a play:

> The teacher assigns parts for the day and students begin reading their parts at 1:33. All are quiet and attentive. There are 10 parts and 24 students. These students have been reading this play, not everyday, but on and off for over a week. ...The teacher is watching carefully. She gets up at one point and goes over to Jesse. Jesse had his book out in front of him and has certainly made no noise. Apparently he was writing something. The teacher turns the page to the right page for Jesse. She doesn't say anything. He makes a resigned face and puts whatever he has been writing on under the book. He begins to read along, pointing as she goes back to her desk. The students who are reading read well, in conversational tones. Observer notes that they are not all from the highest spelling group. Kevin frowns and wiggles around. Martha corrects students when they make an error. She does not talk loudly, however. The teacher interrupts once and says, "In the phrase, 'without rel sh', what does relish mean?" No hands go up. The teacher says, "Is it pickle relish?" One student volunteers and says, "It's icing." The teacher say, "No, it's not icing. What does it mean when you say that you eat something 'without relish'?" One student says, "You eat it slow." The teacher replies, "It means you eat it without enjoying it." She explains the significance of this statement in the play. Students continue reading. The teacher interrupts again after one good reading. She says, "Now, Mike didn't read that wrong. He read it right, but we couldn't understand it. Why?" Students call out answers, not loudly. The teacher accepts what they are saying in general and says, "Yes, he's very angry. Have you ever felt so angry that you couldn't talk?" Students say, "Yes." She says, "That part is very hard to read well..." At the end of a part read by the main character, the teacher says, "At the end of that Ann says she longed for something. You are going to have to read between the lines. What does 'long' mean?" Students call out correct answers. The teacher does not say anything particular about their answers; she goes on and says, "What does she really want that she has not admitted to herself yet?"

As these two examples illustrate, in English classes activities that appear to be similar may in fact vary greatly in instructional content.

Time Use, Student Behavior and Student Outcomes in Mathematics Classes

Correlations between class mean time use in different categories and class means of three student behavior measures, student ratings of the teacher, and mean class achievement residuals for mathematics classes are shown in Table 6. No significant relationships were found between mean time use and student ratings of the teacher. Significant relationships between student behavior and class time use were found for amount of class time spent in transitions, dead-time, total nonacademic activity, testing, and total academic time. These correlations suggested there was better student behavior and less classroom disruption in classes with more total academic time (either whole class instruction or seatwork), more testing, and less time spent in transitions, dead-time, and total nonacademic activity. Magnitude of significant Pearson r's ranged from .39 to .54. There are two different, although not mutually exclusive interpretations for these findings: students cooperate and behave better in classes in which teachers plan sufficient work and organize to "protect" time for academic instruction; and/or high rates of disruptive student behavior and lack of student cooperation contribute to longer transitions and more dead-time, thereby cutting into time available for instruction. In addition, in classes which spend more time in testing, there is less off-task or disruptive behavior.

Relationships between mean time use and mean class achievement gains were different from relationships for student behavior. Here, neither total academic time nor the amount of time taken up by procedures, transitions, dead-time, grading or other nonacademic activities were related to achievement. Instead, how instructional time was used appeared to make a difference: higher mean class achievement

gains were related to more time spent in whole class instruction (r = .4252) and less time spent in seatwork (r = -.4160). Not enough of the teachers in our sample used small group instruction for us to make any conclusions about that instructional activity.

These significant correlations for achievement gains in mathematics confirm previous research suggesting that more effective junior high school mathematics teachers utilize more available class time in content development activities than do less effective teachers (Evertson, Emmer, & Brophy, 1980). The fact that time use patterns with regard to content development and seatwork were not related to class behavior means suggests that in mathematics classes effective classroom management and effective use of instructional time may be two relatively independent factors impacting student achievement gains. This inference is supported by findings reported by Emmer (Note 7) working with the JHCOS data base. He identified groups of effective and less effective classroom managers (without using class achievement as a criteria) and found no difference in time use patterns between the two groups. However, among the subset of eight teachers identified as effective managers, use of class time in content development versus seatwork appeared to be related to class mean achievement gains. Results for mathematics activities in the present analysis also are compatible with reported findings for the productivity of student engaged time in class presentations/recitations compared to engagement in seatwork in the BTES fifth grade classes (Borg, 1980; McDonald, Note 1).

Given the relative uniformity of curriculum content and teaching method in mathematics instruction, it may be that in classes in which teachers use much of the available time leading whole class content

development activities, more of the content in the textbook is covered, and this fact results in higher achievement gain scores for the class. Good, Grouws, and Beckerman (Note 5) have reported that a faster pace in mathematics content coverage is related to higher class achievement. In the present study, however, we have no information about content covered in the different classes. An alternative hypothesis would be that more content development time allows more thorough discussion and more practice of content, rather than coveraage of more topics or text pages.

Time Use, Student Behavior and Student Outcomes in English Classes

Relationships between class time use in English classes and student behavior variables, student ratings of the teacher, and class mean achievement residuals bore no resemblance to correlations obtained for mathematics classes. Table 7 shows that no significant correlations were obtained between time-use categories and class mean achievement residuals or class mean student ratings of the teacher. Results obtained for the student behavior variables were not very consistent across the three kinds of measures. More time in seatwork was associated with less off-task, unsanctioned behavior (r = -.4936). Significant relationships were not found with on task or disruptive behavior, although there were strong trends in the expected directions. More time spent in content development showed significant positive correlations (r = .4119) with off-task, unsanctioned behavior, but no significant correlations (or trends) with either of the other two measures of student behavior. Higher ratings of class disruption were also associated with larger amounts of nonacademic time (r = .4443), and smaller amounts of total academic time (r = -4406). Small group work was

related to higher task engagement (r = .3826) and correlations obtained for this activity format and the other two student behavior measures were weak, but in a direction supporting the on-task trend. In general, student behavior appeared to be somewhat better in classes in which larger amounts of time were spent in seatwork with some time in small group instruction. These results for student behavior and the lack of any results for achievement in English classes do not lend support to reports by Stallings (Note 2) on the productivity of engagement time in interactive instruction as opposed to seatwork in secondary remedial reading classes. It seems likely that in classes in the Stallings' sample curriculum and instruction methods (especially activities classed as interactive instruction) were more consistent across classes and instructional objectives were less varied than in the present sample.

Lack of achievement results and the inconsistent behavior results obtained in the English classes in the JHCOS sample suggest that, assuming it makes some difference what kinds of activities students engage in in secondary English classes, the activity categories used in our analysis failed to describe some salient dimensions of activities. Examination of class activity profiles and narrative class records for each of the 25 teachers confirmed this. As discussed in the Activities section of this paper, great variation was found in the nature of tasks which fell into the content development category, and compared to mathematics classes, the seatwork category as well. For example, all of the following English class activities were included in the content development categories: class recitation on grammar topics, teacher lecture on mythology, students reading a story or play aloud (with varying amounts of attention or guidance by the teacher), discussion of

a story or play or poem, teacher reading a poem aloud to the class, students watching a film or listening to a record, teacher presentation on composition skills, dictionary drill, recitation over spelling or vocabulary lessons, and so on. Such variety in instructional approaches and content among classes makes it unlikely that there was a high degree of congruence between what was taught in many classes and what was included in the end-of-year achievement measure in this study. This fact contributed to lack of results obtained for English class mean achievement gains in the present analysis, as it did in an earlier process-product study (Evertson, Anderson, & Brophy, Note 8).

Summary and Implications

Despite the surface uniformity and apparent rigidity of secondary school compared to elementary school classrooms, comparison of classes on average amount of class time spent in content development, seatwork, transitions, all nonacademic activity, testing, and other time use categories shows great differences in the way teachers utilize class time. For mathematics instruction, results of this study combined with previous research suggest some uniformity of instructional approaches and content focus within the activity categories used in this study. Compared to English classes, there is less variation in curriculum materials and greater consensus over curriculum goals and appropriate instructional techniques in mathematics. It is therefore possible to identify classroom variables that clearly contribute to mathematics learning. Results of the present analysis confirm previous findings about the importance of content development time and suggest that use of class time may be a significant dimension of effective mathematics teaching, apart from classroom management.

Differences between results for time use in mathematics and English classes in this study illustrate the importance of considering the subject matter context in studying effective teaching in secondary schools. In English classes, there were less clear patterns of association among class time use, class achievement gains, and student behavior than there were in mathematics classes, and more variation in the content of instructional activities. Results for student behavior in English classes suggested better student behavior was associated with classes where more class time was spent in individual student work, not whole class instruction; however, results were not consistent for the three different variables. At any rate, the absence of any results for achievement in English classes provides us with no suggestions about effective time use patterns, other than suggestions from qualitative data that highlight the importance of pacing, variety, and accountability.

Establishing links between classroom activities and learning outcomes in secondary English classes will require first, better identification and measurement of learning goals and second, analysis of classroom activities in more detail than that produced by simple categorization of format and academic/nonacademic focus. Doyle (Note 9) has suggested several dimensions that could prove productive in future studies: the relationship of classroom activities to academic task demands, the signal systems or action supports within lessons (see also Kounin & Doyle, 1975; Gump, Note 10), information processing demands or other action requirements on students, organizational complexity, and pace of content coverage. Doyle's recommendations, and the results of this present analysis suggest the importance of considering classroom

management variables, instructional variables, and curriculum variables simultaneously in research in secondary classrooms. Good (Note 4) and others have also suggested that future research should focus more on students' effects on classroom processes or outcomes. One way to accomodate many of these recommendations would be to narrow the focus of studies to the teaching of specific topics within a curriculum area. A series of such studies focusing on different types of topics and learning goals might enable researchers to build up a knowledge base about instruction in secondary schools that goes beyond the generic skills that have been suggested by research to date.

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Table 1

Stability of Time Use Across Two Classes

for Mathematics and English Teachers

Time Use Categories	Mathematics Teachers (n = 26)		English Teachers (n = 25)	
	Intraclass Correlations	p	Intraclass Correlations	p
Administrative/procedural routine	.5913	.01	.6148	.01
Transitions	.8500	< .01	.8226	< .01
Grading	.5172	.04	.7894	< .01
Content development	.8351	< .01	.7742	< .01
Seatwork	.8128	< .01	.6455	< .01
Tests	.8092	< .01	.7548	< .01
Dead time	.7316	< .01	.7924	< .01
Small group work	.9918	< .01	.7799	< .01
Other	.0000	.68	.6941	< .01
Nonacademic activity	.6007	.01	.8215	< .01
Total time	.5520	.02	.4230	.09
Total academic time	.5233	.03	.8504	< .01
Ratio content development/ content development and seatwork	.8507	< .01	.6696	< .01

Table 2

Time Use in Mathematics Classes

Activity or Time Use Category	Mean Raw Minutes per Class Meeting	Standard Deviation	Range of Teacher Means
Administrative/procedural routine	3.76	2.24	.38 - 9.16
Transitions	4.83	2.44	1.06 - 10.54
Grading	4.12	2.50	.25 - 10.06
Content development	15.33	6.94	6.34 - 33.37
Seatwork	19.81	7.37	8.13 - 35.25
Tests	2.90	3.39	0.00 - 10.53
Dead time	1.71	1.65	0.00 - 6.31
Small group instruction	1.18	5.46	0.00 - 28.47
All nonacademic activities	14.42	3.88	6.50 - 21.85
Total minutes	54.29	2.00	50.59 - 59.06
Total academic time	39.23	4.00	31.66 - 46.73

Table 3

Comparison of Mean Minutes of Class Time Use

for Selected Mathematics Teachers*

	Teacher A	Teacher B	Teacher C	Teacher D	Category Mean 26 Teachers
Content development	6.34	33.25	10.00	15.54	15.33
Seatwork	29.56	8.13	8.13	17.69	19.81
Small group instruction	0.00	0.00	28.47	0.00	1.18
Grading	3.66	3.56	3.27	4.85	4.12
Dead time	.31	0.00	0.07	2.31	1.71
All nonacademic activities	9.84	7.63	9.53	21.85	14.42
Total class time	53.37	53.81	56.27	55.08	54.29
Mean class achievement residual	-.4223	.9786	.0674	-.0787	-.0035
Mean class student off task unsanctioned	.05	.01	.05	.11	.10

* Based on eight observations of two class sections per teacher.

Table 4

Time Use in English Classes

Activity or Time Use Category	Mean Raw Minutes per Class Meeting	Standard Deviation	Range of Teacher Means
Administrative/procedural routine	5.77	2.50	1.00 - 11.00
Transitions	3.77	1.42	1.88 - 7.73
Grading	2.54	2.54	0.00 - 10.45
Content development	15.57	6.02	4.75 - 28.50
Seatwork	19.61	5.15	10.71 - 28.79
Tests	3.02	2.59	0.00 - 8.38
Dead time	1.40	1.38	0.00 - 5.38
Small group instruction	1.19	2.32	0.00 - 8.86
All nonacademic activities	13.48	3.83	4.93 - 21.73
Total minutes	53.89	2.26	49.19 - 57.92
Total academic time	39.39	5.51	25.55 - 52.22

Table 5

Comparison of Mean Minutes of Class Time Use

for Selected English Teachers*

	Teacher E	Teacher F	Teacher G	Teacher H	Category Mean 25 Teachers
Content development	25.64	23.92	4.75	11.91	15.57
Seatwork	15.00	14.62	23.50	24.45	19.61
Small group instruction	0.00	0.00	3.81	.36	1.19
Grading	2.73	5.15	4.00	0.00	2.54
Dead time	.82	.23	1.50	3.91	1.40
All nonacademic activities	13.73	11.38	16.12	12.64	13.48
Total class time	55.00	53.38	49.19	50.55	53.89
Mean class residual achievement gain	.1814	-.2596	-.0164	-.3900	.0068
Mean class student off task unsanctioned	.04	.12	.03	.10	.07

* Based on eight observations of two class sections per teacher.

Table 6

Pearson Correlations between Time Spent in Activity Categories and Class Means for Student Behavior and Outcomes in Mathematics Classes

Activity/Time Use Category	Class Means for Student Behavior Measures**			Class Means for Student Ratings of Teacher	Class Mean Achievement Residuals
	Off task Unsanctioned	On Task	Disruptions		
Administrative/ procedural routine	-.1111	.0816	-.2250	-.1690	-.0037
Transitions	.3321	-.4353	.4756	-.0996	-.2638
Grading	.1488	.0114	.0361	-.0638	.0163
Content development	-.0533	.1545	-.2059	.1837	.4252
Seatwork	.1654	-.1706	.2619	-.1052	-.4160
Tests	-.3927	.2728	-.3925	-.1972	.1384
Dead time	.2739	-.5412	.3899	-.1514	-.0904
Small group work	-.1643	.2610	-.1318	.2553	.0587
Nonacademic time	.3568	-.4491	.3581	-.2656	-.1954
Total academic time	-.3445	.5411	-.3870	.3068	.1688

Significance at $p \leq .05$ is indicated by underline; n = 26 teachers (2 classes each).

** Across all activities in 16 observations per teacher

Table 7

Pearson Correlations between Time Spent in Activity Categories and Class Means for Student Behavior and Outcomes in English Classes

Activity/Time Use Category	Class Means for Student Behavior Measures**			Class Means for Student Ratings of Teacher	Class Mean Achievement Residuals
	Off task Unsanctioned	On Task	Disruptions		
Administrative/ procedural routine	-.1298	.2336	.0884	-.2730	.1074
Transitions	.0507	-.2945	.2059	.0915	-.3032
Grading	-.0926	.0423	.2627	-.0390	.2614
Content development	.4119	-.1919	-.0408	-.2689	.1562
Seatwork	-.4936	.3295	-.3751	.3693	.1253
Tests	.3237	-.1821	.1673	-.3008	.1166
Dead time	.2510	-.6691	.3759	-.0481	-.1304
Small group work	-.3310	.3826	-.2953	.3286	-.0561
Nonacademic time	-.0373	-.1691	.4443	-.1879	-.0845
Total academic time	.0024	.1732	-.4406	.0476	.0851

Significance at $p \leq .05$ is indicated by underline; $n = 25$ teachers (2 classes each).

** Across all activities in 16 observations per teacher